THAT WHICH IS CLAIMED IS:

1   1.   A method of enabling data access and manipulation from a

2   pervasive device, comprising steps of:

3   receiving a data access request from a pervasive device;

4   obtaining the requested data;

5   determining what data manipulation operations are available

6   for the obtained data, as well as a location of each available

7   data manipulation operation; and

8   returning the determined data manipulation operations and

9   locations to the pervasive device, in addition to the obtained

10   data.

1   2.   The method according to Claim 1, further comprising steps

2   of:

3   requesting operation of a selected one of the determined

4   data manipulation operations; and

5   performing the requested operation, wherein the performing

6   step is executed by another device on behalf of the pervasive

7   device.

1   3.   The method according to Claim 1, wherein the determining

2   step further comprises determining what data manipulation

3   operations are available for a content type of the obtained

4   data.

1   4.   The method according to Claim 3, wherein the determining

2   step further comprises determining what data manipulation

3   operations are available for a user of the pervasive device.

1   5.   The method according to Claim 3, wherein the determining

2   step further comprises determining what data manipulation

3   operations are available for a current location of the pervasive

4   device.

1   6.   The method according to Claim 1, wherein the determining

2   step further comprises determining what data manipulation

3   operations are available for a user of the pervasive device.

1   7.   The method according to Claim 6, wherein the step of

2   determining what data manipulation operations are available for

3   the user of the pervasive device further comprises obtaining

4   information about the user from a protocol header of the data

5   access request.

1 8. The method according to Claim 6, wherein the step of

2 determining what data manipulation operations are available for

3 the user of the pervasive device further comprises obtaining

4 information about access privileges of the user.

1 9. The method according to Claim 8, wherein the information

2 about access privileges of the user is obtained from a

3 repository which stores access privilege information.

1 10. The method according to Claim 1, wherein the determining

2 step further comprises determining what data manipulation

3 operations are available for a user group of which a user of the

4 pervasive device is a member.

1 11. The method according to Claim 1, wherein the determining

2 step further comprises determining what data manipulation

3 operations are available for a current location of the pervasive

4 device.

1 12. The method according to Claim 11, wherein the step of

2 determining what data manipulation operations are available for

3 the current location of the pervasive device further comprises

4 accessing a global positioning system ("GPS") function of the

5   pervasive device or a location registry associating the

6   pervasive device with a plurality of access points.

1   13.   The method according to Claim 1, wherein the determining

2   step further comprises determining what data manipulation

3   operations are available for the pervasive device.

1   14.   The method according to Claim 13, wherein information used

2   in the step of determining what data manipulation operations are

3   available for the pervasive device is obtained from a protocol

4   header which specifies types of content accepted by the

5   pervasive device.

1   15.   The method according to Claim 13, wherein information used

2   in the step of determining what data manipulation operations are

3   available for the pervasive device is obtained from a protocol

4   header which specifies browser capabilities of a browser

5   operating on the pervasive device.

1   16.   The method according to Claim 13, wherein information used

2   in the step of determining what data manipulation operations are

3   available for the pervasive device is obtained by analyzing

4   capability information provided by the pervasive device.

1   17.   The method according to Claim 13, wherein information used

2   in the step of determining what data manipulation operations are

3   available for the pervasive device is obtained from a repository

4   which specifies capabilities of the pervasive device.

1   18.   The method according to Claim 2, wherein the requested

2   operation is a file storage operation.

1   19.   The method according to Claim 2, wherein the requested

2   operation is a print operation.

1   20.   The method according to Claim 2, wherein the requested

2   operation is one of a fax operation, an e-mail operation, a

3   project operation, or a voice mail application.

1   21.   The method according to Claim 2, further comprising the

2   step of annotating selected ones of the locations of the

3   determined data manipulation operations with an identifier of

4   respective ones of the obtained data.

1   22.   The method according to Claim 2, further comprising the

2   step of annotating selected ones of the returned data

3   manipulation operations and locations with one or more cookies

4   which were present on the received data access request.

1   23.   The method according to Claim 2, further comprising the

2   step of annotating selected ones of the returned data

3   manipulation operations and locations with one or more

4   parameters for use by the performing step.

1   24.   The method according to Claim 23, wherein a selected set of

2   the parameters which are returned to the pervasive device and

3   provided in the requesting step and are then used by the

4   performing step.

1   25.   The method according to Claim 23, wherein the annotating

2   step is performed by a protocol proxy component which receives

3   the data access request in the receiving step, and wherein the

4   annotating step is performed prior to operation of the returning

5   step.

1   26.   The method according to Claim 25, wherein the determining

2   and returning steps are performed by the protocol proxy.

1   27.   The method according to Claim 25, wherein the protocol

2   proxy receives requests and transmits responses using Hypertext

3   Transfer Protocol ("HTTP") messages.

1   28.   The method according to Claim 25, wherein the protocol

2   proxy receives requests and transmits responses using Wireless

3   Session Protocol ("WSP") messages.

1   29.   The method according to Claim 25, wherein the protocol

2   proxy receives requests and transmits responses using Simple

3   Mail Transfer Protocol ("SMTP"), Post Office Protocol ("POP" or

4   "POP3"), or Internet Message Access Protocol ("IMAP") messages.

1   30.   The method according to Claim 25, wherein the protocol

2   proxy receives requests and transmits responses using a

3   synchronization protocol.

1   31.   The method according to Claim 25, wherein the protocol

2   proxy is configured to accept requests from the pervasive

3   device.

1   32.   The method according to Claim 25, wherein the protocol

2   proxy and the pervasive device communicate through a wireless

3   access point.

1   33.   The method according to Claim 2, wherein:

2   the locations comprise address information for each

3   determined data manipulation operation;

4   the requesting operation step further comprises issuing a

5   request using the address information of the selected data

6   manipulation operation; and

7   the performing step further comprises executing a service

8   which is located using the address information of the issued

9   request.

1   34.   The method according to Claim 1, wherein the returning step

2   further comprises returning at least one graphical symbol or

3   icon for particular ones of the returned data manipulation

4   operations and locations.

1   35.   The method according to Claim 1, wherein the determining

2   step further comprises accessing a data structure to locate

3   information used by the returning step, wherein the data

4   structure stores information about the data manipulation

5   operations that are available for the obtained data and the

6   location of each available data manipulation operation.

1   36.   The method according to Claim 35, wherein new data

2   manipulation operations are supported for use in the determining

3   step by adding information about the new data manipulation

4   operations and the location of each new data manipulation

5   operation to the data structure.

1   37.   The method according to Claim 1, wherein the determining

2   step further comprises:

3   accessing a data structure to locate information used by

4   the returning step, wherein the data structure stores

5   information about the data manipulation operations that are

6   available for the obtained data; and

7   dynamically determining the location of each available data

8   manipulation operation.

1   38.   The method according to Claim 37, wherein the dynamically

2   determining step further comprises evaluating at least one of

3   current processor load and current network conditions.

1 39. The method according to Claim 2, wherein the requesting

2 step is performed by a user of the pervasive device.

1 40. The method according to Claim 2, wherein the requesting

2 step is performed programmatically without intervention of a

3 user of the pervasive device.

1 41. The method according to Claim 2, further comprising the

2 step of programmatically requesting, by a protocol proxy, a

3 selected data manipulation operation on the obtained data, and

4 wherein the returning step returns a result of the selected data

5 manipulation operation as the obtained data.

1 42. The method according to Claim 1, further comprising the

2 step of automatically invoking one or more of the determined

3 data manipulation operations.

1 43. The method according to Claim 42, wherein the automatically

2 invoking step operates before the returning step.

1 44. The method according to Claim 1, further comprising the

2 steps of:

3   determining one or more selected data manipulation

4   operations that should be performed automatically on the

5   obtained data;

6   performing the selected data manipulation operations on the

7   obtained data, thereby creating transformed data; and

8   using the transformed data as the obtained data for the

9   step of determining what data manipulation operations are

10   available.

1   45. The method according to Claim 2, further comprising the

2   step of dispatching the requested operation, by a manager which

3   receives the operation request, to the other device prior to

4   operation of the performing step.

1   46. The method according to Claim 45, further comprising the

2   step of passing information to the manager along with the

3   operation request, wherein the passed information enables the

4   manager to ensure that the performing step operates on data

5   which is identical to the returned data.

1   47. The method according to Claim 46, wherein the passed

2   information comprises one or more cookies which are present in a

3   header of the data access request.

1   48.   The method according to Claim 1, wherein operation of the

2   steps requires no additional software on the pervasive device.

1   49.   The method according to Claim 1, wherein operation of the

2   steps requires no additional hardware on the pervasive device.

1   50.   A system for enabling data access and manipulation from a

2   pervasive device, comprising:

3   means for receiving a data access request from a pervasive

4   device;

5   means for obtaining the requested data;

6   means for determining what data manipulation operations are

7   available for the obtained data, as well as a location of each

8   available data manipulation operation; and

9   means for returning the determined data manipulation

10   operations and locations to the pervasive device, in addition to

11   the obtained data.

1   51.   The system according to Claim 50, further comprising:

2   means for requesting operation of a selected one of the

3   determined data manipulation operations; and

4   means for performing the requested operation, wherein the

5   means for performing is executed by another device on behalf of

6   the pervasive device.

1   52.   Computer program instructions for enabling data access and

2   manipulation from a pervasive device, the computer program

3   instructions embodied on one or more computer readable media and

4   comprising:

5   computer program instructions for receiving a data access

6   request from a pervasive device;

7   computer program instructions for obtaining the requested

8   data;

9   computer program instructions for determining what data

10   manipulation operations are available for the obtained data, as

11   well as a location of each available data manipulation

12   operation; and

13   computer program instructions for returning the determined

14   data manipulation operations and locations to the pervasive

15   device, in addition to the obtained data.

1   53.   The computer program instructions according to Claim 52,

2   further comprising:

3   computer program instructions for requesting operation of a

4   selected one of the determined data manipulation operations; and

5   computer program instructions for performing the requested

6   operation, wherein the means for performing is executed by

7   another device on behalf of the pervasive device.

1   54. A method of enabling a pervasive device to access and

2   manipulate remotely-stored data, comprising steps of:

3   receiving a data access request from the pervasive device;

4   obtaining the requested data;

5   determining what data manipulation operations are available

6   for the obtained data, as well as a location of each available

7   data manipulation operation; and

8   returning the determined data manipulation operations and

9   locations to the pervasive device, in addition to the obtained

10   data.

1   55. A method of accessing and manipulating remotely-stored data

2   from a pervasive device, comprising steps of:

3   requesting an access of the remotely-stored data from the

4   pervasive device; and

5   receiving the requested data at the pervasive device, along

6   with information about one or more data manipulation operations

7   that have been determined to be available for the obtained data.

1   56.   The method according to Claim 56, wherein the information

2   further comprises a location of each available data manipulation

3   operation.

1   57.   The method according to Claim 56, further comprising the

2   step of requesting operation of a selected one of the data

3   manipulation operations.